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INFLUENCE OF AN EDUCATIONAL DEMONSTRATION PROGRAM ON DAIRYMEN'S ADOPTION OF FARM PRACTICES. PAPER PRESENTED AT THE NATIONAL SEMINAR ON ADULT EDUCATION RESEARCH (CHICAGO, FEBRUARY 11-13, 1968).

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PENNSYLVANIA STATE UNIVERSITY AND THE TENNESSEE VALLEY AUTHORITY CONDUCTED A FIVE YEAR (1961-66) AGRICULTURAL EDUCATION PROJECT IN TWO PENNSYLVANIA COUNTIES. THIS PAPER REPORTED THE PRELIMINARY FINDINGS. USING THE CRITERION OF ADOPTION OF SELECTED AGRICULTURAL PRACTICES BY SURROUNDING FARMERS, THEY ATTEMPTED TO MEASURE THE INFLUENCE OF 17 DEMONSTRATION DAIRY FARMS. DATA ON GENERAL AGRICULTURAL TECHNOLOGY, FARM MANAGEMENT SKILLS, FARM PRACTICE ADOPTION, PATTERNS OF FORMAL AND INFORMAL ACTIVITIES, INTERPERSONAL VISITING AND COMMUNICATION, AND ATTITUDES, GOALS, AND VALUES WERE GATHERED BY FIELD SURVEYS BEFORE AND AFTER THE ACTION PROGRAM. SOME OF THE FINDINGS INDICATED THAT THOSE MAKING THE MAJOR CHANGE IN RECOMMENDED PRACTICES WERE DAIRYMEN OTHER THAN THE INNOVATORS OR EARLY ADOPTERS, THAT THE GREATEST CHANGE TOOK PLACE AMONG THAT GROUP OF FARMERS WHO HAD THE GREATEST POTENTIAL. HOWEVER, WHILE THE EDUCATIONAL PROGRAM DID INFLUENCE CHANGES IN ADOPTION OF PRACTICES, MOST OF THE EXPLAINED VARIANCE WAS ATTRIBUTED TO SUCH EXTRANEOUS FACTORS AS INDIVIDUAL CHARACTERISTICS, RELATIONSHIPS WITH OTHER PERSONS AND ORGANIZATIONS, LEVEL OF FARM TECHNOLOGY, AND VARYING CULTURAL CONDITIONS IN THE TWO COUNTIES. (THE DOCUMENT INCLUDES FOOTNOTES AND EIGHT TABLES.) THIS DOCUMENT WAS A PAPER PRESENTED AT THE NATIONAL SEMINAR ON ADULT EDUCATION, (CHICAGO, FEBRUARY 11-13, 1968). (LY)

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Influence of An Educational Demonstration Program on Dairymen's Adoption of Farm Practices

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Introduction

The purpose of this paper is to report findings from a research project aimed at measuring the effectiveness of a farm demonstration educational program. The result demonstration method of teaching was used by Seaman A. Knapp to teach farmers how to control the boll weevil in 1903. That method of informal teaching was considered so effective that the Smith-Lever Act of 1914 which established federal support for the Extension Services said in part "Cooperative Agricultural Extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics."[1] "After over half a century of cooperative Extension work, the result demonstration contimues to be one of the most important teaching methods of Extension."[2] Over the years the result demonstration has become an integral part of the variety of methods used by Extension to communicate with clientele.

Since 1935, the TVA has sponsored the use of test demonstration farms within the Tennessee Valley Area as well as other areas of the United States. The major purpose has been to introduce improved fertilizers and fertilizer practices. But, a secondary purpose has been to demonstrate systems of farm operations that will increase income, level of management skills, and general productivity. In carrying out these demonstrations, the Tennessee Valley Authority has cooperated with the Extension Services. The general technique is to have demonstrations on selected farms so as to encourage adoption of recommended practices by the demonstrators themselves as well as surrounding nondemonstrators. It is assumed that the demonstrators will influence others by the example they set..

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[1](Smith-Lever Act as amended in 1962, Section II).

[2](Ben D. Cook, "Result Demonstrations and Result Demonstration meetings," The Cooperative Extension Service, edited by H. C. Sanders and others, Prentice Hall Inc., Englewood Crest, New Jersey, p. 128).

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The objective of the research reported in this paper was to determine the diffusion of practices from the demonstration farms to the farmers in the surrounding areas.

Review of Research

As Bailey points out, "There is an extensive body of literature concerning the use of demonstrations in farmer education, however, most of it is purely descriptive of the demonstrations. Few have attempted to evaluate result demonstrations as an educational technique in the sense of their influence on the adoption behavior of people other than the demonstrator."[3]

The evidence from various projects substantiate that demonstrations do influence the person playing the role of the demonstrator in terms of increased productivity and motivation. However, with regard to diffusion of information to surrounding farmers, the evidence is less clear; the research designs used usually did not yield the necessary rigorous and precise findings. Much of the evidence on diffusion is based on verbal responses collected in cross sectional surveys; for example, in a recent Illinois study, 90% of the test demonstration farmers recalled acquaintances having told them they adopted demonstration practices, particularly in the area of soil fertility; almost half of the nearby neighbors admitted they had changed their fertilizer practices after observing demonstration results. However, one-third of the neighbors were not aware of the demonstration program.[4]

The research findings indicate that the demonstration program has been well received by the demonstrator as well as by various publics. The demonstrators are generally regarded as above average sources of information, and as adopters of recommended practices; furthermore, the demonstration method has become an integral part of the Extension program. What knowledge exists is based primarily on ex post facto research rather than a longitudinal or experimental design. Rigorous evidence on the effectiveness of diffusing information to surrounding farmers is lacking.

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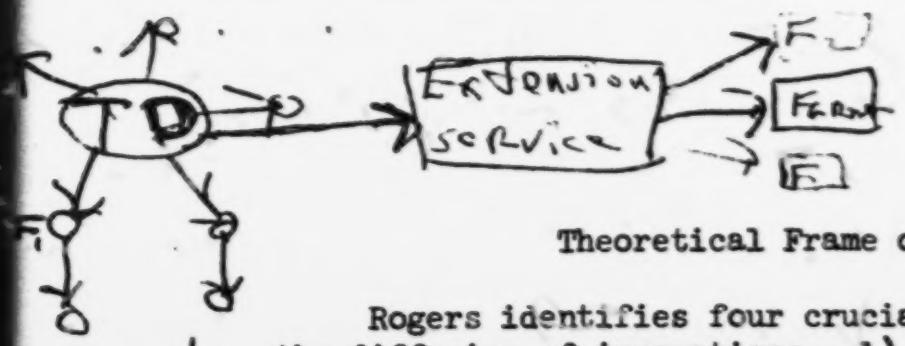
[3](Wilfrid C. Bailey, "Result Demonstrations and Education," Journal of Cooperative Extension, Volume II, No. 1, p. 15).

[4](Franklin Graham, Effectiveness of Test Demonstration Farms, M.S. thesis, University of Illinois, 1966).



Theoretical Frame of Reference

Rogers identifies four crucial elements in the analysis of the diffusion of innovations. 1) the innovation, 2) its communication from one individual to another, 3) in a social system, 4) over time.[5] These elements are closely related to those mentioned by Bailey as explaining the effectiveness of demonstrations: 1) characteristics of demonstrations, 2) characteristics of demonstraters, 3) characteristics of the audience, and 4) characteristics of the community or the total social milieu in which the demonstration takes place.[6]

Not all practices can be equally demonstrated by the result demonstration method. Longest and Alexander point out "Techniques as complex as studying a farm business and using farm records for doing so will not diffuse from farmer to farmer as have simplier practices, such as, use of improved seed or high analysis fertilizer."[7] Other researchers have found the characteristics of practices demonstrated to be an important variable in acceptance. Most practices demonstrated on TVA farms are highly visible, inexpensive, fairly simple and compatible with the type of existing farm operations, can be divided into trial units, and can be communicated without much difficulty. The exception would be that of maintaining farm records and communicating management skills. The extent to which farmers perceive the demonstrator as a member of his reference groups would also be relevant. Communication about practices would be more effective between farmers with somewhat similar personal, social, and farm situational characteristics. Communication would not occur at a uniform rate around demonstration farms because the surrounding farmers are not homogeneous with regard to personal, social, and situational characteristics. The social system of which the farmer is a member would have norms which influence adoption of new ideas. It has been reported that communities have norms which encourage or discourage the adoption of new ideas. Organizations and cliques to which farmers belong would expect to exert influence regarding adoption.

Few of the practices demonstrated are really completely new; therefore, we would expect that the innovators would not be the ones who would be most influenced by these demonstration farms. In fact, it is assumed that the function of the demonstration farms is to have neighbors influence neighbors. Hence, since the innovators

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[5](Everett M. Rogers, Diffusion of Innovations, The Free Press of Glencoe, New York, 1962, p. 12).

[6](Bailey, op.cit., p. 17).

[7](James W. Longest, Frank D. Alexander and Jean L. Hershal, "The Function of the Neighborhood in the Farm and Home Management: A Case Study," Rural Sociology, June, 1961, p. 191).

are usually influenced to adopt by mass media or by professional sources, we would expect most impact from these demonstration farms to be on those farmers who are not the innovators in their communities.

The Educational Program

The educational or action program studied was one of a series of educational programs carried on cooperatively by the Pennsylvania State University and the Tennessee Valley Authority. It involved the establishment periodically of a number of demonstration farms within selected counties in Pennsylvania. The county extension staff, with the assistance of university extension specialists then built a five-year action educational program around the demonstration farms. Because of the involvement of TVA, the emphasis was on the adoption of agronomic practices, particularly a high fertility program.

For the educational program under study, eight demonstration farms were selected in Indiana County and nine in Susquehanna County. The selection committee in each county was composed of members of the extension executive committee, bankers, businessmen, and farmers.[8]

Responsibilities of Demonstration Farmers

The demonstration farmers indicated their willingness to cooperate with the program by entering into a formal agreement with the Extension Service and TVA. According to the terms of this contract the demonstrator agreed--

(a) To apply the fertilizer supplied by the Tennessee Valley Authority to the fields as scheduled;
(b) To secure and apply at his expense lime and/or other fertilizers as recommended by the Extension Service;
(c) To leave untreated such areas as may be designated for use as check areas for comparison with treated areas;
(d) To keep and furnish a farm account record on forms supplied by the Extension Service and to keep and furnish such other records as date of seeding, date of fertilizer application, date of harvest, yield, and unusual weather, insects, or disease conditions, as the Extension Service may recommend;

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[8]Supposedly, the committees were to make their selections before information about the program became general knowledge in the counties. However, three of the cooperators in Susquehanna County not only had knowledge of the program beforehand, but specifically requested that they be considered by the committee as possible demonstrators.

(e) To permit the Extension Service to make such visits and to arrange for such meetings on the farm as may serve to acquaint people of the community with results of the farming practices followed;
(f) To grant the Extension Service and the Tennessee Valley Authority the right to use the data of the results in correspondence, publications and lecture;
(g) To take soil samples and pay the expense of testing.

Role of the Extension Service

The Extension Service agreed to assist the demonstrators in making the essential surveys, soil tests, farm business analyses, and livestock, equipment, and land utilization plan. The Extension Service also furnished at cost a farm account record form on which a beginning inventory, a record of farm receipts and disbursements, and a closing inventory for each year could be recorded. In Susquehanna County, the associate county agent conducted a series of five training sessions for the nine demonstrators in record keeping, using the correspondence course from Penn State as the basis. All nine demonstrators participated and completed the course.

The primary responsibility of the county staffs was to develop an educational program that would induce the adoption of the agronomic and management practices introduced and/or used on the demonstration farms by other farmers in the two counties. No guidelines or counsel was given to the county staffs in this area. The staff in each county was left on its own to develop the kind of educational and publicity program that it considered most effective in disseminating the information and ideas utilized on the demonstration farms to the farmers in the surrounding neighborhoods and to the counties as a whole.

In both counties, the progress of the demonstration farmers was noted in newspaper articles and extension radio programs. Special educational meetings and field days were held on various demonstration farms. The demonstrators themselves were called on frequently at extension and other agricultural meetings to describe what they were doing on their farms. To a more or less degree, the demonstration program was integrated into the ongoing county extension program.

Methodology

The "action" or educational program actually began in the fall of 1961. At that time, the seventeen demonstrators were chosen. Implementation of the program, however, did not begin until the spring of 1962, when TVA fertilizer was first applied by the demonstrators. The public was given no general knowledge of the program until midsummer of 1962.

In June of 1962, 621 dairy farmers in Indiana and Susquehanna Counties were interviewed to obtain a benchmark against which to measure and evaluate the change which would take place in the two counties over the next four or five years which could be attributed to the demonstration program. Except for 29 refusals, all farmers within a four to seven mile radius, depending on topographical boundaries, around the demonstration farms who shipped fluid milk were interviewed. In Susquehanna County this included practically all the commerical farmers and numbered 407. Indiana County has a more diversified agriculture. The number of respondents there was 214, which represented approximately one-half of the commercial farms in the geographical area in which interviews were taken. In both counties the number of dairymen interviewed was roughly one-third of the total number of dairymen in the county.

Information obtained in the benchmark interview included details about the levels of general agricultural technology, management skills, farm practice adoption, participation of the operator in formal and informal activities, interpersonal visiting and communication network patterns, and attitudes, goals, and values held by the dairy farmer.

A similar survey was conducted in the fall of 1966. An important addition to the terminal interview instrument, however, was the inclusion of a series of questions on the demonstration program. Information was obtained on knowledge of the program in general and various recommended practices in particular, personal acquaintance with the demonstrators, and evaluation of the ideas and practices which had been introduced on the demonstration farms.

An attempt was made in this terminal survey to interview the same farm operators as those interviewed in 1962. However, 31% of the Indiana and 41% of the Susquehanna samples had, in the meantime, died or dropped out of dairy farming. In 20% of these cases, another operator was dairying on the same farm. Although these replacements were interviewed, their data are not included in this report since there would be no base with which to compare their status at the time of the terminal survey. The sample for this study, then, consists of 388 dairy farmers - 148 in Indiana County and 240 in Susquehanna County - situated in those areas immediately surrounding the sixteen demonstration farms in the two counties.

The sample in Susquehanna County is for all practical purposes the universe of farmers within the geographical area in which interviews were conducted. Therefore, an attempt was made to obtain a sample of the contacts other farmers made with the demonstration farmers in an effort to trace possible channels of communication, particularly with respect to ideas and practices introduced on the demonstration farms. The demonstrators were provided with "contact slips" which could be filled out very hurriedly and which contained a minimum of information about a daily interpersonal contact: who

the person was, which party initiated the contact, when and where it took place, and the main topics of discussion. Although cooperation on the part of the demonstrators was less than enthusiastic in this endeavor, a sampling of contacts were obtained for a two year period.

Supplementing this effort, the associate county agent in Susquehanna County was quite cooperative in keeping a fairly detailed record of his contacts with the demonstrators and the use that was made of the demonstration farms in the ongoing total extension program in the county.

Field days were held on several of the demonstration farms during the five year period. Two of these field days were observed by the investigators and a record of attendance kept at both. Nine months after each field day a sample of the farmers in attendance was interviewed to determine what information was actually conveyed to and retained by those in attendance, and whether the ideas and practices demonstrated had stimulated adoption or consideration of adoption by the viewers.

These data referred to in the above paragraphs, together with a review of the information about the program or the demonstration farmers which appeared in the local newspapers of the two counties, were used to determine the "input" of the educational program by the extension staff.

The Dependent Variable

The dependent variable in this study is the change in practice usage from 1962 to 1966. If the demonstration program has any impact on the farmers in the area surrounding the demonstration farms, it should be manifested in changes in those practices which received emphasis in the educational program.

Information about the use of more than forty practices was obtained from each respondent in the benchmark and terminal study. At the beginning of the program, university specialists had counselled with the investigators on the selection of a wide range of practices which would possibly be recommended on the demonstration farm during the five year program. At the end of the program, the three specialists who had worked most closely with the county staffs and the demonstrators chose from this list those practices which they felt had received the most emphasis in the educational program, and which were most crucial with respect to the general agricultural needs of the two counties.

There were 21 practices on which all three specialists agreed. These were then incorporated into a practice usage index, which expressed quantitatively the fraction of those practices applicable

to a respondents' situation which he had adopted. These practices were then subjected to trace line analysis which resulted in two being eliminated.[9] The revised index included thefollowing practices:

(1) Use of complete soil test for each pasture field at least once every three years;
(2) Use of complete soil test for each crop field at least once every three years;
(3) Regular use of lime on pastures (according to lime test);
(4) Regular use of lime on crop field (according to lime test);
(5) Use of fertilizer on pasture fields;
(6) Topdressing of hay or legumes;
(7) Use of fertilizer on other crops;
(8) Use of alfalfa and/or trefoil as a grass crop;
(9) Band seeding of grasses;
(10) Use of spray for leaf hoppers and/or spittle bugs;
(11) Use of spray for alfalfa weevil;
(12) Sowing legumes without a nurse or cover crop;
(13) Use of forage testing;
(14) Use of corn for silage;
(15) Use of atrazine for weed control on corn;
(16) Use of side band placement attachment on corn planter;
(17) Planting of corn after corn successively on same ground;
(18) Keeping of D.H.I.A. or other production records for each cow;
(19) Keeping of complete farm record book.

Operationally, then, the dependent variable is the change in the practice usage index from 1962 to 1966. The 1962 index score was subtracted from the 1966 score. A positive value in the dependent variable indicates an increase in the number of the recommended practices adopted. A negative value indicates the rejection of one or more practices or a change in the farm operation which would make one or more of the practices applicable which were not applicable in 1962.

An example would be a farmer who did not grow corn in 1962 and who was using eight of the recommended practices at that time. His inded score for 1962 would be .445. If between 1962 and 1966 he

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[9] James H. Copp, "Trace Line Analysis, An Improved Method of Item Analysis," Paper read at the annual meeting of the Rural Sociological Society, 1960, University Park, Pennsylvania.

began to grow corn for silage, but did not adopt the use of atrazine for weed control on his corn, or use a side band placement attachment on his planter, nor plant corn after corn on the same ground, his index score would drop to .428. It can be argued that he has improved his level of practices, but in terms of the emphasis of the demonstration program he has accepted only part of a complex of recommended practices.

The average practice usage index score increased from .408 to .493, which is an increase of 21% and represents roughly the equivalent of two new practices. There was a significant difference between the two counties in the change in the practice usage index score, however. Susquehanna County's average increased only .078, while Indiana County's increased .097.

Findings

Awareness of the Demonstration Program

The purpose of this study is to determine the impact of the demonstration farm program on the surrounding farmers. In other words, how much of the change with respect to those items which received emphasis in the demonstration program, can be attributed to the program itself?

There was a distinct difference in the scope and intensity of the educational program developed by the Extension staff in the counties. Although the results of the demonstration program were given recognition and utilized in the overall extension program, in Indiana Co., the demonstration program as such was not emphasized. None of the demonstrators were interviewed on a radio or TV program, for example, and the number of articles in the newspapers mentioning the demonstration farms were few.

In Susquehanna County, on the other hand, extensive publicity was given to the demonstration farm program. Many articles about the demonstrators and the results they were achieving on their farms were printed in the local newspaper. Something about the demonstrators and/or their farms were mentioned on an average of twice weekly in the county agents' radio programs. In addition, several of the demonstrators themselves appeared on radio and TV programs. A number of these programs originated on the demonstration farms. The farms were also the scene of numerous meetings and two field days during the summers; the demonstrators quite frequently gave testimoney at winter meetings sponsored by Extension and other agricultural organizations or businesses. Four by six foot signs announcing that this was a demonstration farm were displayed at each of the demonstration farms.

Despite these apparent differences in the educational program inputs, there was little difference in the awareness of the demonstration farm

program on the part of farmers in the two counties. The proportion of respondents who had heard about the program was exactly the same in both counties. (see Table 1) For almost every channel of communication about the program, Indiana County farmers were represented in greater proportions than Susquehanna County dairymen. The one exeception is in the proportion of farmers who viewed a TV program. About twice as many Susquehanna dairy farmers reported such an experience as did Indiana farmers. About the same proportion of farmers in both counties reported a mental evaluation of the practices or actually tried out ideas demonstrated.

In both counties, the main source of information about the demonstration farm program was the county extension office or staff, either through word of mouth or via extension office mailings. Thirty-five per cent of the respondents reported having learned of the program from the extension staff. Another 15 per cent read about it in the newspapers. Ten per cent said they learned of it from a demonstration farmer.

Table 1. Awareness of the Demonstration Farm Program by Other Farmers

	Indiana County (per cent)	Susquehanna County (per cent)	Both Counties (per cent)
Heard about program	86.9	86.9	86.9
Attended a field day or meeting on a demonstration farm	35.8	38.4	37.3
Read in newspaper about demonstration farm program	75.0	67.7	70.5
Heard on radio about demonstration farm program	47.7	41.5	43.9
Saw TV program about demonstration farm program	14.2	26.2	21.6
Attended meeting at which demonstration farm mentioned	42.6	36.5	38.9
Talked to another farmer about demonstration farm program	31.2	29.1	29.9
Results on demonstration farms made you think about changing something on your own farm	36.9	35.1	35.8
Actually tried out any of the ideas demonstrated	34.7	30.9	32.3

When pressed for specific information, however, only one-fifth of the respondents were aware of anything that was "really going on" at a demonstration farm. Even among this 20 per cent, there was some confusion. "Demonstration" is a well-used word in extension vocabulary, and many respondents did not differentiate what they had heard about the program under study from numerous other "demonstrations" put on by

the extension office. Interviewers collected a list of names of reported demonstration farmers, several of whom were later identified as persons who had served as "demonstrators" for Extension over the past several years. In addition, some of the knowledge recalled was quite incidental to the main thrust of the demonstration program. For example, ten per cent of the respondents in Susquehanna County, in reporting what was being demonstrated in the program, mentioned a mechanical stone picker which was used as a publicity technique to promote attendance at one field day held on a demonstration farm.

Analysis of Data

There are significant differences in the dependent variable associated with various levels of awareness or knowledge of the demonstration farm program, particularly in Indiana County. (see Table 2.) In almost all groups the differences between the counties is also significant. One of the interesting findings is the difference between the counties among those respondents who had no knowledge about the demonstration program. In Indiana County this group had a significantly greater change in practice usage than did those farmers who had knowledge of the program, but who were not letting that knowledge manifest itself behaviorally be talking to other farmers about the program or by changing their own farming operations. In Susquehanna County the group that did not know about the program had significantly less change than those who knew about it. For those dairymen in various adoption categories concerning the demonstrated practices, the change scores were fairly uniform.

Tables 3 and 4 show the relationship between average change in practice usage to degrees of acquaintanceship with the individual demonstration farmers. The differences among the levels of acquaintanceship when calculated for each demonstrator are significant. However, it is apparent there is no pattern whatsoever in the variation among levels.

Several previous studies found a relationship between the adoption of recommended practices and the distance from the demonstration farms. Table 5 shows the average change in practice usage for each mile zone from the demonstration farms. Without considering any other factors contributing to the variance, there is no linear relationship between amount of change in the dependent variable and distance from the demonstration farm. In Susquehanna County the change decreases in a linear fashion after three miles.

Regression Analysis

Quite obviously there are many factors operating in the variability of the change in practice usage. One method that allows the assessment

of the individual and joint effects of a multitude of possible contributing factors is multiple linear correlation analysis. This technique permits the inclusion of multiple effects, and by assessing the relative importance of each component, it provides information relevant for assigning differential weights to each, and thereby enabling a ranking of the factors.

The methodology utilized followed two steps. First, all the quantitative variables which could conceivably have a causal relationship with the change in practice usage were incorporated as independent variables in a multiple regression program with parsimony.[10]

From this procedure a total of 30 quantitative variables were isolated as having a significant influence on the change in practice usage. The ordering of these variables according to the partial correlation coefficients was quite different for the two counties, indicating that the independent variables were exercising rather different effects on the dependent variable in the context of each county.

The second stage was to include nine qualitative variables with these forty quantitative variables in a least squares regression analysis. This was done by the use of a dummy variable technique in which each category in a qualitative variable was treated as a dichotomous variable quantified as zero or unity. These "dummy" variables were then incorporated into the analysis and treated as real variables. It must be remembered, however, that the coefficients generated for these dummy variables are applicable only to those cases which fail within the category of the original qualitative variable represented by the "dummy" variable. Hence,

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[10]Usually the principle of parsimony is applied in regression analysis by the escalator method. Independent variables are added one at a time to the regression equation according to some criterion and the effect of the additional variables on the residual variance noted. If the residual variance is significantly reduced, the added variable is retained in the regression equation; if not, it is discarded.

The method used in this study was to start with all available variables in the regression equation and then to eliminate some in a de-escalation procedure. If b_i is the least squares estimate -- the true regression coefficient of x_i, and $s^2_{b_i}$ is its sample variance; at any stage of the elimination if the quantity $b^2_i / s^2_{b_i}$ is the smallest in the entire set of b^2/s^2_b at that stage, and the partial correlation coefficient $r_{yx_i.x_jx_k \ldots x_z}$ is not significant. See Hubert M. Blalock, Jr., Social Statistics (New York: McGrawHill Book Company, 1960), pp. 326-358; and George W. Snedecor, Statistical Methods (Ames: Iowa State University Press, 1966), pp. 413-445.

the quantitative and the qualitative variables were combined for the least squares regression analysis. This procedure yielded 48 beta coefficients for Indiana County and 50 for Susquehanna County. (see Tables 5 and 6).

The beta weights indicate how much change in the dependent variable (change in adoption index) is produced by a standarized change in one of the independent variables when the others are controlled. The R^2 values, which represent the fraction of variance explained by all the independent variables operating

together, are .314 in Susquehanna and .426 in Indiana.

The ranking of the variables differs considerably in the two counties. In fact, many of them influence the dependent variable in opposite directions. For example, the change in the number of the "top 20" dairy farmers in each county known from 1962 to 1966 is the most influencial variable in both counties but it has a positive influence in Susquehanna and a negative influence in Indiana County.

Several variables relevant to the demonstration program were included for both counties, six of which are dummy variables, referring to proximity to specific demonstrators. None of the program variables alone yielded significant beta coefficients. However the R^2 value for 17 program related variables in Indiana County was .178 and .12 in Susquehanna County, both significant. It is evident that when other factors are controlled, the impact of the demonstration farm program in the diffusion process is rather complex and ambiguous. Many other factors influence changes in adoption of the recommended practices.

Some of the findings indicate that the farmers who made the major change in recommended practices were dairy farmers who were not the innovators or early adopters. The zero-order correlation (r) between the 1962 level of adoption of the recommended practices and the change in adoption scores was— .277 for Susquehanna and—.258 for Indiana. In other words, with respect to the practices receiving emphasis on the demonstration farms, the greatest change took place among that group of farmers who had the greatest potential for "catching up."

Varying cultural conditions in the two counties undoubtedly influence the results. Indiana County had a higher level of adoption at the beginning and showed a greater change in practices adopted during the five years. Hence, counties varied on receptivity to change.

Summary

The paper reports the preliminary findings from an evaluation of a five-year educational project in two counties of Pennsylvania. The major objective was to measure the impact of 17 demonstration farms, using the criterion of adopting selected agricultural practices by surrounding farmers. Data were collected by field survey before and after the action program.

Findings indicate increased use of the demonstrated practices by surrounding farmers in both counties. Evidence on the impact of the demonstration program in effecting these changes is difficult to assess. The farmers were generally aware of the program. While the educational program did influence changes in adoption of practices, most of the explained variance was due to extraneous factors. Personal characteristics of the farmer, his relationships with other individuals and organizations, and the level of technology of the farms largely explained the amount of change in adoption of recommended practices.

This study shed some light on the function of the demonstration farm program other than disseminating ideas and practices to surrounding farmers and effecting changes in the demonstrators themselves. Certainly, it provides a focal point for the total county extension program. Whether this focal point is utilized effectively in the educational program by the county staff is dependent upon the staff's perception of the opportunities available. Although the innovators or progressive farmers of the county are more or less keeping pace with demonstrators, and usually do not use the program as a source of information, the demonstration program presents them with a standard by which they can evaluate their own performance. One of the conspicious groups to attend one of the field days consisted of those farmers who had already adopted most of the practices demonstrated, but who by their own testimony had come to compare the results on the demonstration farms with their own results.

Another function served by the program was that of organizational integration. Usually extension specialists do not join forces across disciplinary boundaries. Within this program, however, specialists from agronomy, farm management, dairy science, and agricultural engineering were forced to work together, so to speak, which meant that their recommendations were formulated with a consideration of those of the other disciplines in mind, and their own role in relation to the demonstrators became subservient to the norms of the overall Extension organization.

The demonstration also created a notable amount of publicity for the Cooperative Extension Service.

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Tables For:

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by

Emory J. Brown and Joel Hartman

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ED002739

Table 1. Awareness of the Demonstration Farm Program by Other Farmers.

	Indiana County (per cent)	Susquehanna County (per cent)	Both Counties (per cent)
Heard about program	86.9	86.9	86.9
Attended a field day or meeting on a demonstration farm	35.8	38.4	37.3
Read in newspaper about demonstration farm program	75.0	67.7	70.5
Heard on radio about demonstration farm program	47.7	41.5	43.9
Saw TV program about demonstration farm program	14.2	26.2	21.6
Attended meeting at which demonstration farm mentioned	42.6	36.5	38.9
Talked to another farmer about demonstration farm program	31.2	29.1	29.9
Results on demonstration farms made you think about changing something on your own farm	36.9	35.1	35.8
Actually tried out any of the ideas demonstrated	34.7	30.9	32.3

Table 4-A. Relationship of Mean Level of Change in Practice Usage Index to Distance from Demonstration Farms

Distance (in mile zones)	Indiana County	Susquehanna County	Both Counties
1	.194 (5)+	.097 (19)	.117
2	.091 (21)	.072 (55)	.077
3	.144 (27)	.110 (88)	.111
4	.124 (33)	.057 (48)	.084
5	.082 (27)	.037 (20)	.063
6	.028 (16)	-.017 (8)	.013
7	-.102 (12)	-.072 (2)	.077
8	-.066 (6)	--	.066
9	.026 (1)	--	.026

*Figures in parentheses are number of cases.

Table 2. Relationship of Mean Level of Change in Practice Usage Index to Degrees of Knowledge of Demonstration Farm Program and Adoption of Practices Demonstrated.

	Indiana County	Susquehanna County	Both Counties
(1) No knowledge of demonstration farm program (not included in any categories below)	.109 (20)*	.027 (32)	.059
(2) Talked to someone else about program	.138 (42)	.086 (73)	.105
(3) Did not talk to someone else about the program	.074 (86)	.086 (135)	.081
(4) Results of demonstrations made you think about changing something on your farm	.118 (50)	.084 (85)	.097
(5) Results of demonstrations did not make you think about changing something on your farm	.081 (78)	.087 (123)	.085
(6) Have actually tried out practices demonstrated on demonstration farm	.114 (50)	.094 (75)	.102
(7) Have not tried out anything demonstrated on demonstration farm	.083 (78)	.081 (133)	.082

Significance levels of differences among combinations of the above groups for the two counties as determined by simple analysis of variance are as follows:

Among groups 1, 2, and 3	$P < .01$	n.s.
Among groups 1, 4, and 5	$P < .01$	$P < .05$
Among groups 1, 6, and 7	$P < .01$	$P < .01$

*Figures in parentheses are n's for sub-classes.

Table 3. Relationship of Mean Level of Change in Practice Usage Index to Degree of Acquaintanceship with Particular Demonstrators (Indiana County).

Demonstrator	Don't Know	Know Demonstrator	Talked to Demonstrator	Visisted Demonstrator's Farm
1	.105 (78)*	.091 (12)	.134 (19)	.066 (39)
2	.078 (73)	.142 (10)	.045 (12)	.127 (53)
3	.086 (94)	.084 (15)	.120 (20)	.139 (19)
4	.086 (98)	.095 (18)	.101 (13)	.153 (19)
5	.092 (111)	.079 (11)	.140 (17)	.101 (9)
6	.073 (111)	.140 (9)	.171 (11)	.182 (17)
7	.080 (56)	.062 (21)	.112 (20)	.124 (51)

*Figures in parentheses are n's for sub-classes.

Table 4. Relation of Mean Level of Change in Practice Usage Index to Degree of Acquaintanceship with Particular Demonstrators (Susquehanna County).

Demonstrator	Don't Know	Know Demonstrator	Talked to Demonstrator	Visited Demonstrator's Farm
1	.058 (155)	.126 (22)	.121 (20)	.106 (43)
2	.076 (149)	.057 (27)	.114 (22)	.077 (42)
3	.074 (165)	.067 (20)	.116 (19)	.082 (36)
4	.085 (142)	.076 (29)	.072 (23)	.060 (46)
5	.081 (177)	.066 (13)	.090 (26)	.056 (24)
6	.080 (194)	.067 (12)	.092 (24)	.015 (10)
7	.085 (181)	.042 (18)	.093 (11)	.050 (30)
8	.066 (117)	.063 (38)	.116 (27)	.093 (58)
9	.095 (107)	.073 (50)	.056 (20)	.059 (63)

*Figures in parentheses are n's for sub-classes.

Table 5. Rank Order of Beta Coefficients for Independent Variables in Indiana County (R^2 = .426).

Independent Variables	Beta Coefficients
Change in equipment index	.298**
Number of farm magazines subscribed to in 1962	-.242*
Talked to someone about demonstration farms	.224
Opinion about being in farming five years from now (1962) (Probability expressed on scale from 0 to +5)	-.216*
Milking - time index (measure of labor management with ideal score low)	-.180
Change in Extension participation score	.176
Zone from nearest demonstration farm visited	-.168
Self-evaluation of quickness to adopt new practices (Evaluation expressed on scale from 0-5)	.159
Equipment index (1962)	.150
Leadership score for economic organizations in 1962	.148
Attended a field day or meeting on a demonstration farm	-.148
Number of demonstrators talked to	.147
Located geographically closest to demonstrator 4	-.137
Age in weeks calves are weaned from cow (Ideal = 0)	-.135
Frequency of attendance at church	-.131
Acreage farmed in 1962	-.126
Being free or debt - goal in life ranked first	.125
Formal participation score (social organizations) in 1962	-.123
Gross farm sales in 1962	.117
Change in fraction or gross farm income from dairying	.114
Knew some of the things that were demonstrated	-.114
Change in interaction index	.110
Household convenience index (1962)	.103
Age of respondent	-.101
Change in acreage farmed	-.094
Education of respondent	-.092
Professional agricultural person as source of information about milk production	-.085
Milking herd size	-.085
Located geographically closest to demonstrator 5	.079
Located geographically closest to demonstrator 2	-.069
Satisfaction with accomplishments as a farmer (Satisfaction express on a scale from 0 to +5)	-.064
Change in fraction of time worked off-farm	-.063
Distance from nearest demonstrator talked to	-.063
Extension participation score for 1962	.060
Fraction of time worked off-farm in 1962	-.058
Commercial sources of information about fertilizer	.052
Number of "Top 20" Farmers known in 1962	-.052

Table 5. (continued)

Independent Variables	Beta Coefficients
Zone from nearest demonstrator	.048
Located geographically closest to demonstrator 1	-.045
Having modern farm equipment - goal in life ranked first	-.042
Located geographically closest to demonstrator 7	-.033
Change in herd size	.024
Having modern conveniences in home - goal in life ranked first	.021
Results of demonstration program made think about or actually try out new practices	.015
Number of children living at home (1962)	.015
Providing children with good education - goal in life ranked first	.014
Having children marry and live nearby - goal in life ranked first	-.014
Change in number of "Top 20" farmers talked to	.012

Analysis of Variance Table

	Sum of Squares	d.f.	Mean Square	F-value
Total	3.297	147		
Regression	1.405	48	.0293	1.531
Error	1.892	99	.0191	$p < .05$

* Significantly different from zero at .05 level.

** Significantly different from zero at .01 level.

Table 6. Rank Order of Beta Coefficients for Independent Variables in Susquehanna County (R^2 = .314).

Independent Variables	Beta Coefficients
Change in number of "Top 20" farmers known	.221**
Commercial sources of information about fertilizer	.207*
Located geographically closest to demonstrator 8	.194
Located geographically closest to demonstrator 1	.166
Change in equipment index	.150*
Number of children living at home	.144
Professional agricultural person as source of information about fertilizer	.137
Being free of debt - goal in life ranked first	.134
Change in fraction of time worked off-farm	-.134
Milking herd size	-.127
Change in fraction of gross farm income from dairying	.111
Located geographically closest to demonstrator 9	.096
Having modern farm equipment goal in life ranked first	.095
Extension participation score (1962)	-.090
Equipment index (1962)	.086
Opinion about being in farming five years from now	.086
Change in herd size	.085
Located geographically closest to demonstrator 7	-.084
Frequency of attendance at church	.080
Talked to someone about the demonstration program	.076
Commercial sources and magazines as sources of information about milk production	-.075
Zone from nearest demonstrator	-.070
Number of "Top 20" farmers talked to	-.068
Formal participation score (social organizations, 1962)	-.067
Age of respondent	-.066
Providing children with good education - goal in life ranked first	.065
Located geographically closest to demonstrator 2	.062
Milking-time index (measure of labor management with ideal score low)	-.056
Number of farm magazines subscribed to (1962)	.054
Education of respondent	.042
Household convenience index (1962)	-.041
Having modern conveniences in home - goal in life ranked first	.040
Acreage farmed in 1962	.037
Leadership score for economic organizations (1962)	-.037
Professional agricultural person as source of information about milk production	-.033
Located geographically closest to demonstrator 4	-.029
Change in extension participation score	-.027
Self-evaluation of quickness to adopt new practices (Evaluation expressed on scale from 0-+5)	-.026
Number of demonstrators talked to	-.024

Table 6. (continued)

Independent Variables	Beta Coefficients
Distance from nearest demonstrator talked to	.022
Age in weeks calves are weaned from cow (Ideal = 0)	.021
Fraction of time worked off-farm in 1962	-.021
Having children marry and live nearby - goal in life ranked first	-.021
Changed in acreage farmed	-.020
Attended a field day or meeting on a demonstration farm	-.019
Gross farm sales (1962)	.012
Satisfaction with accomplishments as a farmer (satisfaction expressed on a scale from 0-+5)	.010
Distance from nearest demonstration farm visited	.003
Knew some of the things that were demonstrated	.002
Results of demonstration program made think about or actually try out new practices	-.002

Analysis of Variance Table

	Sum of Squares	d.f.	Mean Square	F-value
Total	6.002	239		
Regression	1.882	50	.0376	1.727
Error	4.120	189	.0218	$p < .01$

* Significantly different from zero at .05 level.

** Significantly different from zero at .01 level.